Trend Study 17-34-02

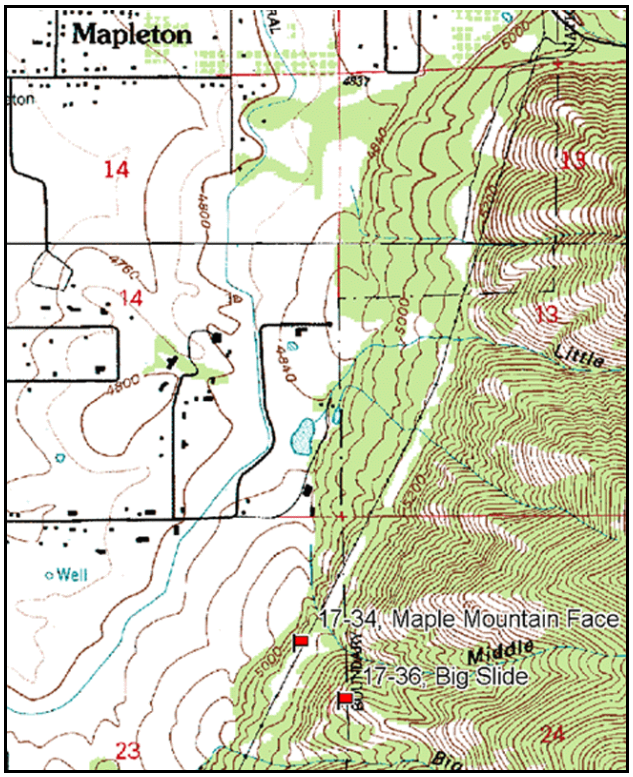
Study site name: Maple Mountain Face . Vegetation type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 192 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (87ft).

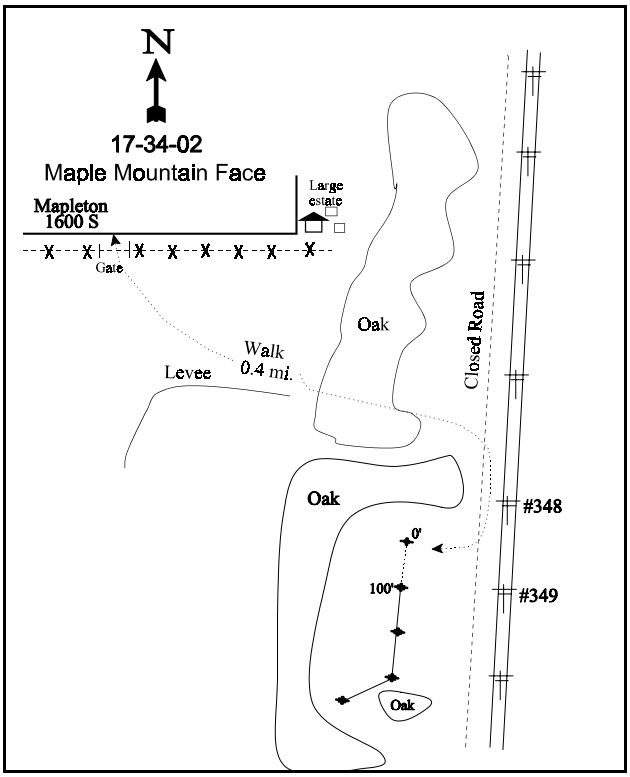
LOCATION DESCRIPTION

Drive up 1600 South in Mapleton to the end of road. Park and hike east for 0.4 miles to the old road that runs parallel to power lines. A small sagebrush clearing west of the road is where the site is located. The 0-foot baseline stake is in the north end of the clearing, 33 paces from power pole #349 at an azimuth of 342 degrees magnetic. The 0-foot stake has browse tag #442 attached. The study stakes are 12-18" tall green fenceposts.



Map Name: Spanish Fork Peak

Township 8S , Range 3E , Section 23



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4440080 N 452199 E

DISCUSSION

Maple Mountain Face - Trend Study No. 17-34

The Maple Mountain Face study samples one of the few remaining sagebrush-grass range types on the severe winter range located on the upper lake terrace southeast of Mapleton. A fire burned through the site prior to the 1997 reading. Slope on the site is 1-2% with a south aspect. Elevation is approximately 5,100 feet. The site is used by wintering big game and in the spring by cattle. Data from a pellet group transect read along the study baseline in 2002 estimated light wildlife use at 4 deer and 2 elk days use/acre (10 ddu/ha and 5 edu/ha). Cattle use was estimated at 19 days use/acre. They had been grazing on the site prior to the June 7th, 2002 reading. Cattle had also used the area in 2001.

Soil on this lake terrace is a loam with an effective rooting depth of over 27 inches. The pH is slightly acidic (pH 6.3), with an average soil temperature of 51.2° F at nearly 18 inches in depth in 1997. Parent material appears to be limestone. Very little rock or pavement was encountered on the soil surface or throughout the profile, but the upper soil layer was conspicuously compacted. Due to the gentle terrain and high vegetative cover, mostly from bulbous bluegrass, there was no noticeable erosion apparent in 1997 or 2002.

Four shrub species occur in the immediate area. The most prominent preferred species is mountain big sagebrush. Surrounding the sagebrush openings and occasionally occurring as isolated clumps within the sagebrush is Gambel oak. Density of mountain big sagebrush was estimated at 500 plants/acre in 1983 and 432 plants/acre in 1989. Density declined 50% in 1997 due to the fire that burned the area prior to the 1997 reading. All the plants sampled in 1997 were classified as young. Utilization was light, vigor excellent, and no plants were classified as decadent. Density of sagebrush increased to 440 plants/acre in 2002. All plants were classified as mature. Bitterbrush was planted on the site after the fire. Density was estimated at 120 mostly young plants/acre in 1997. Hedging was moderate with good vigor. Density of bitterbrush increased slightly to 140 plants/acre in 2002, with all plants sampled classified as mature. Utilization was moderate to heavy but vigor was good. Resprouting Gambel oak clones surround the study site. They do not exhibit signs of any hedging. There was also some curlleaf mountain mahogany planted after the burn but it was not sampled in the density strips.

Grass composition is dominated by bulbous bluegrass with much smaller quantities of Sandberg bluegrass, cheatgrass, orchard grass, and intermediate wheatgrass. Annual grasses were reported to be very abundant in the past and included three species of bromes and six weeks fescue. During the 1997 reading, annual grasses made up only 1% of the grass cover. Bulbous bluegrass continues to totally dominate the herbaceous understory by providing 89% of the grass cover in 1997 and 96% in 2002. Several of the taller growing perennial species showed signs of utilization in 2002 due to cattle grazing.

Forb composition in the past was badly depleted. Seeding after the fire has changed the composition of the herbaceous understory since 1989. The most conspicuous and most abundant forb is arrowleaf balsamroot. This species was lightly used and had suffered considerable grasshopper depredation in the past. The seeded species, alfalfa and small burnet, have established and provide some limited forage. Heavy use of alfalfa and yellow salsify was noted in 2002.

1983 APPARENT TREND ASSESSMENT

Soil appears stable although soil is not very fertile and is excessively well-drained which leads to early depletion of soil moisture. Vegetative condition is poor. Mountain big sagebrush appears to be in a state of decline and slowly being replaced by undesirable annual and perennial grasses and forbs.

1989 TREND ASSESSMENT

Trend for soil is down slightly. The percentage of bare soil increased from 1% to 13% of the ground cover, while litter cover declined. Photo and data comparisons from this site conclusively illustrate a disappearing mountain big sagebrush stand. From photos it is evident that there is much less sagebrush production now than 1983. Trend for browse is down slightly due to an increase in the number of decadent sagebrush. The forb composition is similar except for the occurrence of a new pestiferous weed, bindweed or morning glory. As also observed in the 1983 report, the herbaceous vegetation is suffering the effects of grasshopper defoliation. Arrowleaf balsamroot is the most important forb, receiving some spring deer use, yet it continues to have a stable population.

TREND ASSESSMENT
soil - down slightly (2)
browse - down slightly (2)
herbaceous understory - stable but poor (3)

1997 TREND ASSESSMENT

Soil trend is stable. There is no evidence of noticeable erosion and it is unlikely any will occur in the near future. Vegetative cover is abundant and there is only a slight slope. Browse density and cover has declined due to fire, but seeding has introduced bitterbrush which was not previously sampled. Utilization is light on all species except bitterbrush which has moderate utilization. The mostly decadent mountain big sagebrush has been replaced with 200 seedling and 220 young plants/acre. Browse trend is up slightly. Herbaceous understory trend is upward with many palatable species now present. Arrowleaf balsamroot nested frequency has greatly increased with alfalfa and small burnet now present.

TREND ASSESSMENT
soil - stable (3)
browse - up slightly but limited (4)
herbaceous understory - up (5)

2002 TREND ASSESSMENT

Trend for soil is up slightly. Cover of bare ground has declined to only 3% and vegetation and litter cover have increased. Trend for browse is also up slightly. Density of mountain big sagebrush as increased to 440 plants/acre. Use is mostly light and vigor good. Planted bitterbrush density has remained similar to 1997. Use is moderate to heavy but vigor is good. Annual leader growth for sagebrush and bitterbrush is excellent averaging 4 inches for both species. Due to drought conditions for the past few years, trend for the herbaceous understory is down slightly. The site is totally dominated by the low value bulbous bluegrass which provides 96% of the grass cover or 64% of the total herbaceous cover. Sum of nested frequency for perennial grasses has declined slightly, while frequency of perennial forbs declined considerably. The dominant forb is arrowleaf balsamroot which declined significantly in nested frequency. Alfalfa remained stable whereas small burnet declined significantly. Many of the more preferred perennial grasses and forbs displayed heavy use from spring livestock grazing. In order to improve the composition of the herbaceous understory, spring grazing should eliminated.

TREND ASSESSMENT
soil - up slightly (4)
browse - up slightly (4)
herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 34

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
G	Agropyron cristatum	a-	a-	a-	b15	-	-	-	7	-	.11
G	Agropyron intermedium	-	-	4	-	-	-	2	-	.03	-
G	Agropyron spicatum	a-	a-	a-	b21	-	-	-	10	-	.17
G	Aristida purpurea	-	-	-	-	-	-	-	-	-	.00
G	Bromus brizaeformis (a)	-	-	-	3	-	-	-	1	-	.00
G	Bromus japonicus (a)	-	-	a-	b12	-	-	-	6	-	.05
G	Bromus tectorum (a)	-	-	83	48	-	-	31	26	.55	.15
G	Dactylis glomerata	-	-	66	22	-	-	28	10	.75	.64
G	Elymus glaucus	2	-	-	2	1	-	-	1	-	.03
G	Melica bulbosa	a-	a-	a-	b17	-	-	-	7	-	.11
G	Poa bulbosa	a360	b395	b372	b387	100	100	97	99	41.55	58.08
G	Poa pratensis	b61	a-	a-	a5	26	-	-	2	-	.03
G	Poa secunda	b24	a-	d124	c62	11	-	48	28	3.67	.78
G	Sporobolus cryptandrus	a-	a-	a-	b13	-	-	-	7	-	.21
Total for Annual Grasses		0	0	83	63	0	0	31	33	0.55	0.21
Total for Perennial Grasses		447	395	566	544	138	100	175	171	46.02	60.18
Total for Grasses		447	395	649	607	138	100	206	204	46.56	60.39
F	Allium spp.	-	-	1	-	-	-	1	-	.00	-
F	Astragalus spp.	-	-	5	-	-	-	3	-	.04	.00
F	Balsamorhiza sagittata	a103	a99	c248	b156	52	44	92	72	34.34	28.52
F	Calochortus nuttallii	ab5	a-	b15	ab2	2	-	6	2	.03	.01
F	Cirsium spp.	-	-	3	2	-	-	1	1	.00	.00
F	Convolvulus arvensis	-	1	3	7	-	1	2	3	.18	.09
F	Collinsia parviflora (a)	-	-	3	-	-	-	1	-	.00	-
F	Cruciferae	-	-	3	-	-	-	1	-	.03	-
F	Epilobium brachycarpum (a)	-	-	3	-	-	-	1	-	.00	-
F	Eriogonum brevicaule	-	-	-	1	-	-	-	1	-	.00
F	Erodium cicutarium (a)	-	-	3	9	-	-	1	5	.00	.02
F	Erigeron divergens	a7	a1	b59	a-	2	1	27	-	1.50	-
F	Galium aparine (a)	-	-	3	4	-	-	1	2	.00	.01
F	Helianthus annuus (a)	-	5	-	7	-	2	-	4	-	.02
F	Lathyrus brachycalyx	ab4	ab6	b8	a1	2	2	3	1	.09	.01
F	Lactuca serriola	a-	b15	ab10	a-	-	8	4	-	.04	.00
F	Linum lewisii	a-	a-	b8	a-	-	-	5	-	.02	-
F	Medicago sativa	a-	a-	b28	b29	-	-	14	15	.67	.64
F	Phlox longifolia	a-	a-	ab9	b13	-	-	4	6	.04	.05
F	Polygonum douglasii (a)	-	-	-	4	-	-	-	3	-	.01

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
F	Sanguisorba minor	$_{a}$-	$_{a}$-	$_{c}$98	$_{b}$21	-	-	40	12	2.21	.48
F	Sisymbrium altissimum (a)	-	-	$_{b}$15	$_{a}$-	-	-	6	-	.10	-
F	Sphaeralcea coccinea	-	-	-	-	-	-	-	-	-	.00
F	Taraxacum officinale	-	-	3	-	-	-	1	-	.03	-
F	Tragopogon dubius	$_{b}$18	$_{a}$-	$_{ab}$4	$_{b}$12	8	-	3	6	.06	.09
F	Unknown forb-perennial	1	-	-	-	1	-	-	-	-	-
F	Verbascum thapsus	-	-	1	-	-	-	1	-	.15	-
Total for Annual Forbs		0	5	27	24	0	2	10	14	0.12	0.07
Total for Perennial Forbs		138	122	506	244	67	56	208	119	39.47	29.92
Total for Forbs		138	127	533	268	67	58	218	133	39.60	29.99

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 34

Type	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	Artemisia tridentata vaseyana	6	15	.18	1.69
B	Purshia tridentata	6	7	.00	.93
B	Quercus gambelii	2	1	1.48	1.48
B	Rhus trilobata	2	2	.06	.15
Total for Browse		16	25	1.73	4.26

CANOPY COVER --
Herd unit 17 , Study no: 34

Species	Percent Cover	
	'97	'02
Quercus gambelii	-	1

Key Browse Annual Leader Growth
Herd unit 17 , Study no: 34

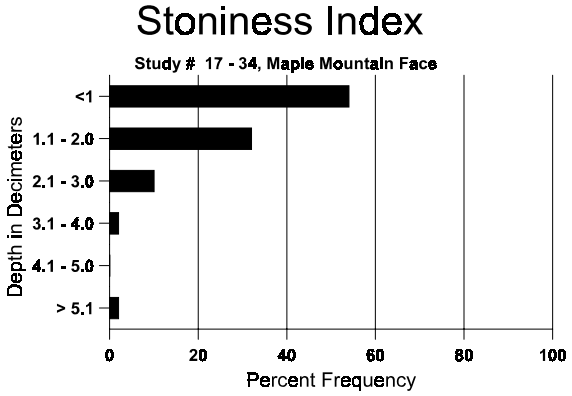
Species	Average leader growth (in)
	'02
Artemisia tridentata vaseyana	4.0
Purshia tridentata	4.0

BASIC COVER --
Herd unit 17 , Study no: 34

Cover Type	Nested Frequency		Average Cover %			
	'97	'02	'83	'89	'97	'02
Vegetation	395	393	4.00	50.75	68.12	80.30
Rock	71	46	.75	.75	1.31	.59
Pavement	215	127	3.00	6.75	6.49	2.96
Litter	374	334	91.00	28.75	18.82	24.19
Cryptogams	132	52	0	0	3.25	1.59
Bare Ground	272	155	1.25	13.00	9.97	2.82

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 34, Maple Mountain Face

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
27.4	51.2 (17.7)	6.3	45.8	30.4	23.8	2.2	13.6	188.8	.5



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 34

Type	Quadrat Frequency	
	'97	'02
Elk	4	-
Deer	1	2
Cattle	9	12

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
'02	'02
26	2 (5)
52	4 (10)
226	19 (47)

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 34

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	10	-	-	1	-	-	-	-	-	11	-	-	-	220			11
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	7	2	-	-	-	-	-	-	8	1	-	-	300	23	32	9
	89	2	-	-	-	-	-	-	-	-	2	-	-	-	66	13	16	2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	18	0
	02	21	1	-	-	-	-	-	-	-	22	-	-	-	440	20	27	22
D	83	3	2	1	-	-	-	-	-	-	5	1	-	-	200			6
	89	9	-	2	-	-	-	-	-	-	9	-	2	-	366			11
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	60%	20%	00%	-14%
'89	00%	15%	15%	-49%
'97	00%	00%	00%	+50%
'02	05%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	500	Dec:		40%
'89	432			85%
'97	220			0%
'02	440			0%

Cercocarpus ledifolius

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	10	16	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	0	Dec:	-
'89	0		-
'97	0		-
'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	1	-	-	-	-	-	-	-	-	1	-	-	-	33	14	28	1
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33	14	15	1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	19	0
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+80%
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	33	Dec:		0%
'89	166			60%
'97	0			0%
'02	0			0%

Purshia tridentata																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	4	-	-	-	-	-	-	-	5	-	-	-	100			5
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	1	-	-	-	-	-	-	-	1	-	-	-	20	10	11	1
	02	-	4	3	-	-	-	-	-	-	7	-	-	-	140	17	38	7
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	83%	00%	00%	+14%
'02	57%	43%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	0	Dec:		-
'89	0			-
'97	120			-
'02	140			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Quercus gambelii																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	14	-	-	-	-	-	-	-	-	14	-	-	-	280			14
	02	-	-	-	-	-	-	6	-	-	6	-	-	-	120			6
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	12	-	-	-	-	-	-	-	-	12	-	-	-	240	45	40	12

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	+22%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'97	280		-
	'02	360		-

Rhus trilobata																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	1	-	-	-	-	-	-	1	-	-	-	20			1
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
	02	-	1	-	-	-	-	-	-	-	1	-	-	-	20	14	30	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	+ 0%
'02	50%	50%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'97	40		-
	'02	40		-